WHAT IS CLAIMED IS:

1. A CATV amplifier, provided on a transmission line between a center equipment of a bi-directional CATV system and a terminal device, for amplifying downward signal in a predetermined frequency band flowing downwardly through the transmission line from the center equipment side to the terminal device side, and upward signal in a predetermined frequency band flowing upwardly through the transmission line from the terminal device side to the center equipment side, respectively, the CATV amplifier comprising:

a downward amplifying circuit for amplifying the downward signal;

an upward L amplifying circuit for amplifying upward L signal which is the upward signal in a frequency band lower than that of the downward signal;

an upward H amplifying circuit for amplifying upward H signal which is the upward signal in a frequency band higher than that of the downward signal;

a first terminal and a second terminal for connecting the CATV amplifier to the transmission line on the center equipment side and on the terminal device side, respectively;

a pair of first filters, connected to the first terminal and the second terminal, respectively, for cutting off the upward H signal and selectively passing the downward signal and the

upward L signal;

a pair of second filters, provided between each of the pair of first filters and the downward amplifying circuit, for cutting off the upward L signal and selectively passing only the downward signal;

a pair of third filters, provided between each of the pair of first filters and the upward L amplifying circuit, for cutting off the downward signal and selectively passing only the upward L signal; and

a pair of fourth filters, provided between the first terminal and the upward H amplifying circuit and between the second terminal and the upward H amplifying circuit, respectively, for cutting off the downward signal and the upward L signal and selectively passing only the upward H signal.

2. A bi-directional CATV system comprising a plurality of CATV amplifiers set forth in claim 1 provided on transmission line between a center equipment and a terminal device, wherein said downward signal, upward L signal and upward H signal can be respectively transmitted between the center equipment and the terminal device.

3. An upward signal amplifier, provided on transmission line between a center equipment of a bi-directional CATV system and a terminal device, and by being attached

externally to an existing CATV amplifier for amplifying downward signal in a predetermined frequency band flowing downwardly through the transmission line from the center equipment to the terminal device, and upward L signal in a predetermined frequency band flowing upwardly through the transmission line from the terminal device to the center equipment, respectively, constituting a CATV amplifier set forth in claim 1 along with the existing CATV amplifier, the upward signal amplifier comprising:

an upward H amplifying circuit for amplifying upward H signal, flowing upwardly through the transmission line and in a frequency band higher than that of the downward signal;

a third terminal and a fourth terminal for connecting the upward signal amplifier to the transmission line on the center equipment side and on the terminal device side, respectively;

a fifth terminal and a sixth terminal for connecting the upward signal amplifier to a terminal for inputting the downward signal and outputting the upward L signal and to a terminal for inputting the upward L signal and outputting the downward signal, of the existing CATV amplifier, respectively;

a pair of first filters, provided between the third terminal and the fifth terminal and between the fourth terminal and the sixth terminal, respectively, for cutting off the upward H signal and selectively passing the downward signal and the upward L signal; and

a pair of fourth filters, provided between the third terminal and the upward H amplifying circuit and between the fourth terminal and the upward H amplifying circuit, respectively, for cutting off the downward signal and the upward L signal and selectively passing only the upward H signal.

4. An upward signal amplifier set forth in claim 3, further comprising:

a pair of power separation filters, provided at least either between said third terminal and said first and fourth filters, or between said fourth terminal and said first and fourth filters, for separating alternating current power signals for power supply, transmitted from an external power unit to the third terminal or the fourth terminal via said transmission line, from each of said downward, upward L and upward H signals; and

a power supply circuit for generating power voltage to operate said upward H amplifying circuit and supplying the power voltage to the upward H amplifying circuit upon receipt of the alternating current power signals separated at one of the pair of power separation filters,

wherein the alternating current power signals separated at the other of the pair of power separation filters are outputted from said fifth terminal or sixth terminal to the terminal for inputting the downward signal and outputting the upward L signal or the terminal for inputting the upward L signal and

outputting the downward signal of said existing CATV amplifier.

5. An upward signal amplifier set forth in claim 4, wherein

said fourth filters are constituted of high pass filters capable of cutting off said alternating current power signals;

said first filters are constituted of low pass filters capable of passing the alternating current power signals;

one of said pair of power separation filters which supplies the alternating current power signals to said power supply circuit, is constituted of the fourth filter and a choke coil connecting between either of said third terminal or fourth terminal and said power unit; and

the other of said pair of power separation filters which supplies the alternating current power signals to said existing CATV amplifier, is constituted of the low pass filter constituting the first filter.

6. A bi-directional CATV system comprising,

on transmission line between a center equipment and a terminal devices,

a plurality of CATV amplifiers respectively amplifying downward signal in a predetermined frequency band flowing downwardly through the transmission line from the center equipment to the terminal device, and upward L signal in a

predetermined frequency band lower than that of the downward signal and flowing upwardly from the terminal device to the center equipment,

the upward signal amplifiers set forth in claim 3 being externally attached to each of the CATV amplifiers so that in addition to the downward signal and the upward L signal, upward H signal in a frequency band higher than the downward signal can be transmitted between the center equipment and the terminal devices.

7. A bi-directional CATV system set forth in claim 6,

wherein in the plurality of CATV amplifiers connected to said transmission line via said upward signal amplifier, the fourth terminal and the sixth terminal of the upward signal amplifier provided for a first CATV amplifier located at a predetermined distance from the center equipment side are terminated at the characteristic impedance of the transmission line,

a terminal for inputting upward L signal and outputting downward signal of the first CATV amplifier and a terminal for inputting downward signal and outputting upward L signal of a second CATV amplifier located at the next stage to the first CATV amplifier are directly connected via the transmission line,

the fifth terminal of the upward amplifier provided for said second CATV amplifier is terminated at the characteristic

impedance of the transmission line, and

the third terminal of the upward signal amplifier provided for the second CATV amplifier is connected to the center equipment via an optical transmission path capable of converting electrical signal to optical signal,

so that upward H signal transmitted from CATV amplifiers located closer to the terminal device than the second CATV amplifier is directly transmitted to the center equipment via the optical transmission path.